

OCCUPATIONAL ANALYSES SERIES

Ironworker (Generalist)



2006

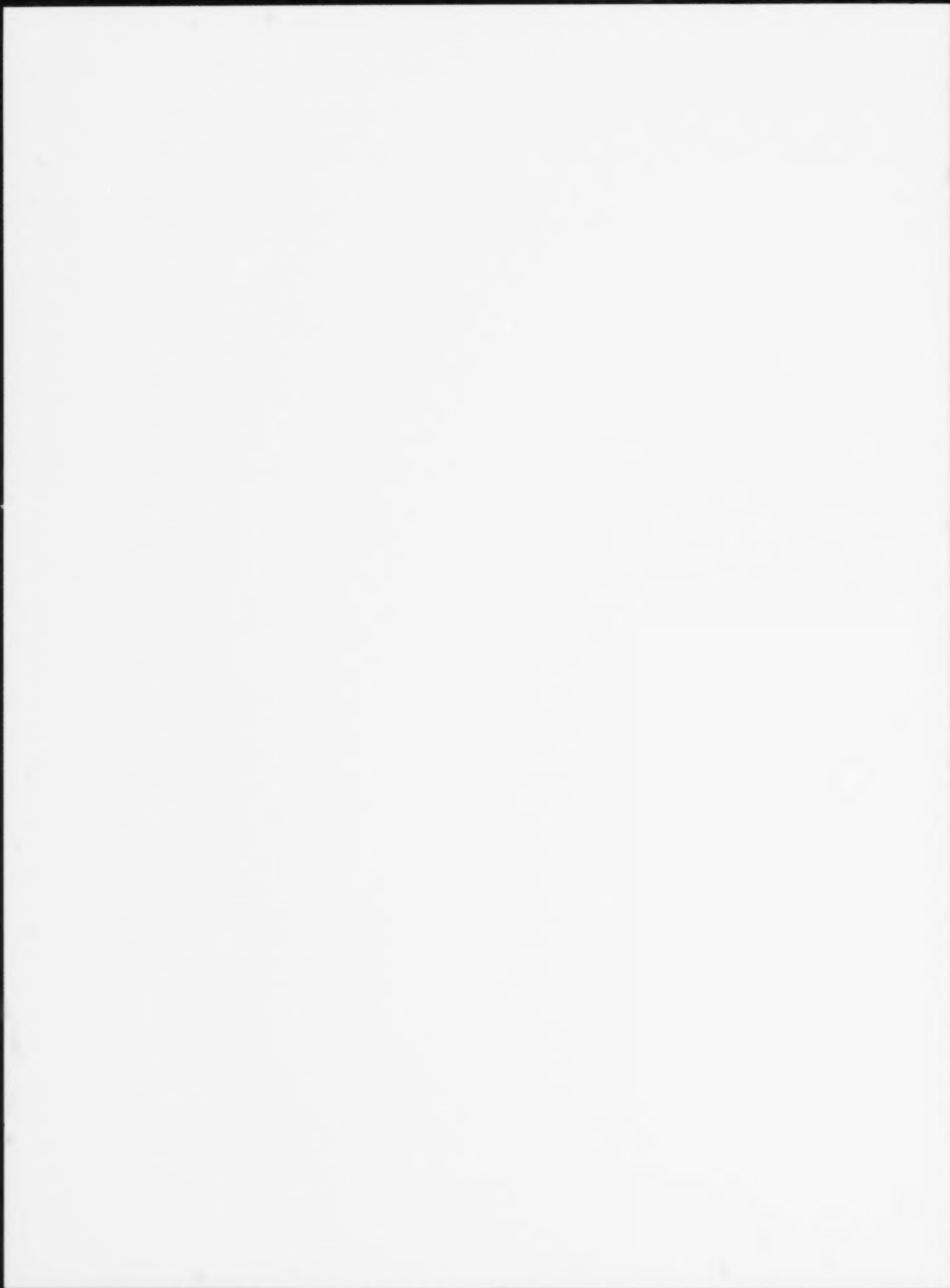


Human Resources and
Social Development Canada

Ressources humaines et
Développement social Canada

Canada

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Occupational Analyses Series

Ironworker (Generalist)

2006

Trades and Apprenticeship Division

Division des métiers et de l'apprentissage

Workplace Partnerships Directorate

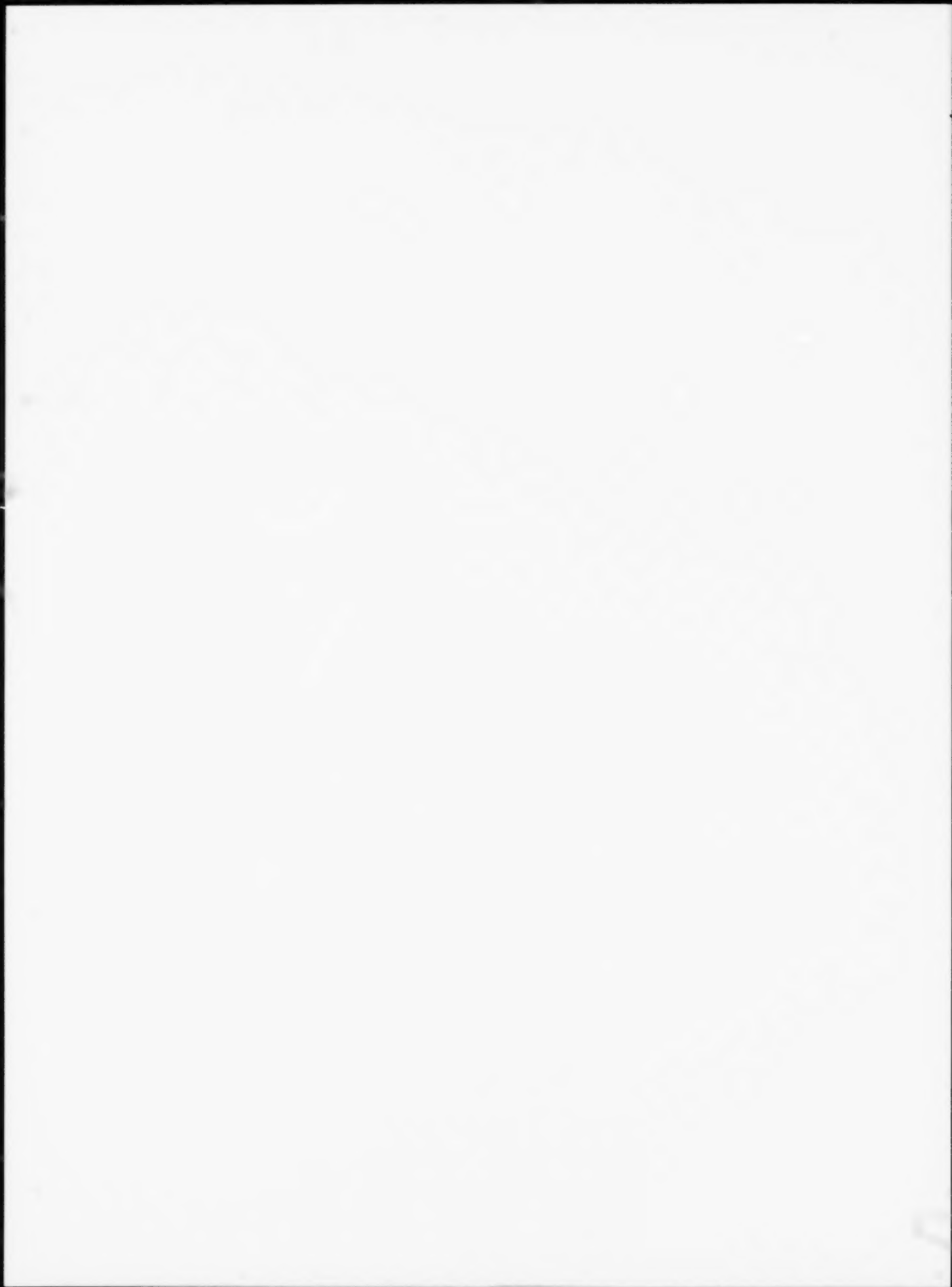
Direction des partenariats en milieu
de travail

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Monteur/monteuse de charpentes en acier
(généraliste)

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The Canadian Council of Directors of Apprenticeship (CCDA) recognizes this occupational analysis as the national standard for the occupation of Ironworker (Generalist).



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* International Association of Bridge, Structural, Ornamental and Reinforcing Iron Workers

This analysis was prepared by the Workplace Partnerships Directorate of HRSDC. The overall planning and coordination of the development of this National Occupational Analysis were undertaken by staff members of HRSDC's Trade and Apprenticeship Division.

OTHER RELATED OCCUPATIONAL TITLES

This analysis covers tasks performed by Ironworkers (Generalists) whose occupational title has been identified by some provinces and territories of Canada under the following names:

- Iron Worker
- Ironworker

LIST OF RED SEAL NATIONAL OCCUPATIONAL ANALYSES

TITLE	NOC* Code
Appliance Service Technician (2005)	7332
Automotive Painter (2005)	7322
Automotive Service Technician (2005)	7321
Baker (2006)	6252
Boilermaker (2003)	7262
Bricklayer (2000)	7281
Cabinetmaker (2000)	7272
Carpenter (2005)	7271
Concrete Finisher (2006)	7282
Construction Electrician (2003)	7241
Cook (2003)	6242
Electrical Rewind Mechanic (1999)	7333
Electronics Technician – Consumer Products (1997)	2242
Farm Equipment Mechanic (2000)	7312
Floorcovering Installer (2005)	7295
Glazier (2004)	7292
Hairstylist (2005)	6271
Heavy Duty Equipment Technician (2004)	7312
Industrial Electrician (2003)	7242
Industrial Instrument Mechanic (2000)	2243
Industrial Mechanic (Millwright) (1999)	7311
Insulator (Heat and Frost) (2000)	7293
Ironworker (Generalist) (2006)	7264
Ironworker (Reinforcing) (2006)	7264
Ironworker (Structural/Ornamental) (2006)	7264
Lather (Interior Systems Mechanic) (2002)	7284
Machinist (2005)	7231
Metal Fabricator (Fitter) (2003)	7263

Mobile Crane Operator (2006)	7371
Motorcycle Mechanic (2006)	7334
Motor Vehicle Body Repairer (Metal and Paint) (2005)	7322
Oil Burner Mechanic (2006)	7331
Painter and Decorator (2000)	7294
Partsperson (2005)	1472
Plumber (2003)	7251
Powerline Technician (2004)	7244
Recreation Vehicle Mechanic (2006)	7383
Refrigeration and Air Conditioning Mechanic (2004)	7313
Roofer (2006)	7291
Sheet Metal Worker (2006)	7261
Sprinkler System Installer (2003)	7252
Steamfitter – Pipefitter (1996)	7252
Tilesetter (2004)	7283
Tool and Die Maker (2005)	7232
Transport Trailer Technician (2003)	7321
Truck and Transport Mechanic (2000)	7321
Welder (2004)	7265

* National Occupational Classification

Requests for these publications should be forwarded to:

**Trades and Apprenticeship Division
Workplace Partnerships Directorate
Human Resources and Social Development Canada
140 Promenade du Portage, Phase IV, 5th Floor
Gatineau, Quebec K1A 0J9**

These publications are also available to order or download online at: www.red-seal.ca.

A comparative listing of apprenticeship training programs across Canada may be accessed at www.ellischart.ca. The Ellis Chart also lists the current provincial and territorial trade names.

FOREWORD

The first National Conference on Apprenticeship in Trades and Industries, held in Ottawa in 1952, recommended that the federal government be requested to co-operate with provincial apprenticeship committees and officials in preparing analyses of a number of skilled occupations. To this end, Human Resources and Social Development Canada (HRSDC) sponsors a program, under the guidance of the Canadian Council of Directors of Apprenticeship (CCDA), to develop a series of occupational analyses.

The Occupational Analysis Program has the following objectives:

- to identify and group the tasks performed by skilled workers in particular occupations;
- to identify those tasks that are performed by skilled workers in every province and territory;
- to develop instruments for use in the preparation of Interprovincial Standards "Red Seal" Examinations and curricula for training leading to the certification of skilled workers;
- to facilitate the mobility, in Canada, of apprentices and skilled workers;
- to supply employers and employees, and their associations, industries, training institutions and governments with analyses of the tasks performed in particular occupations.

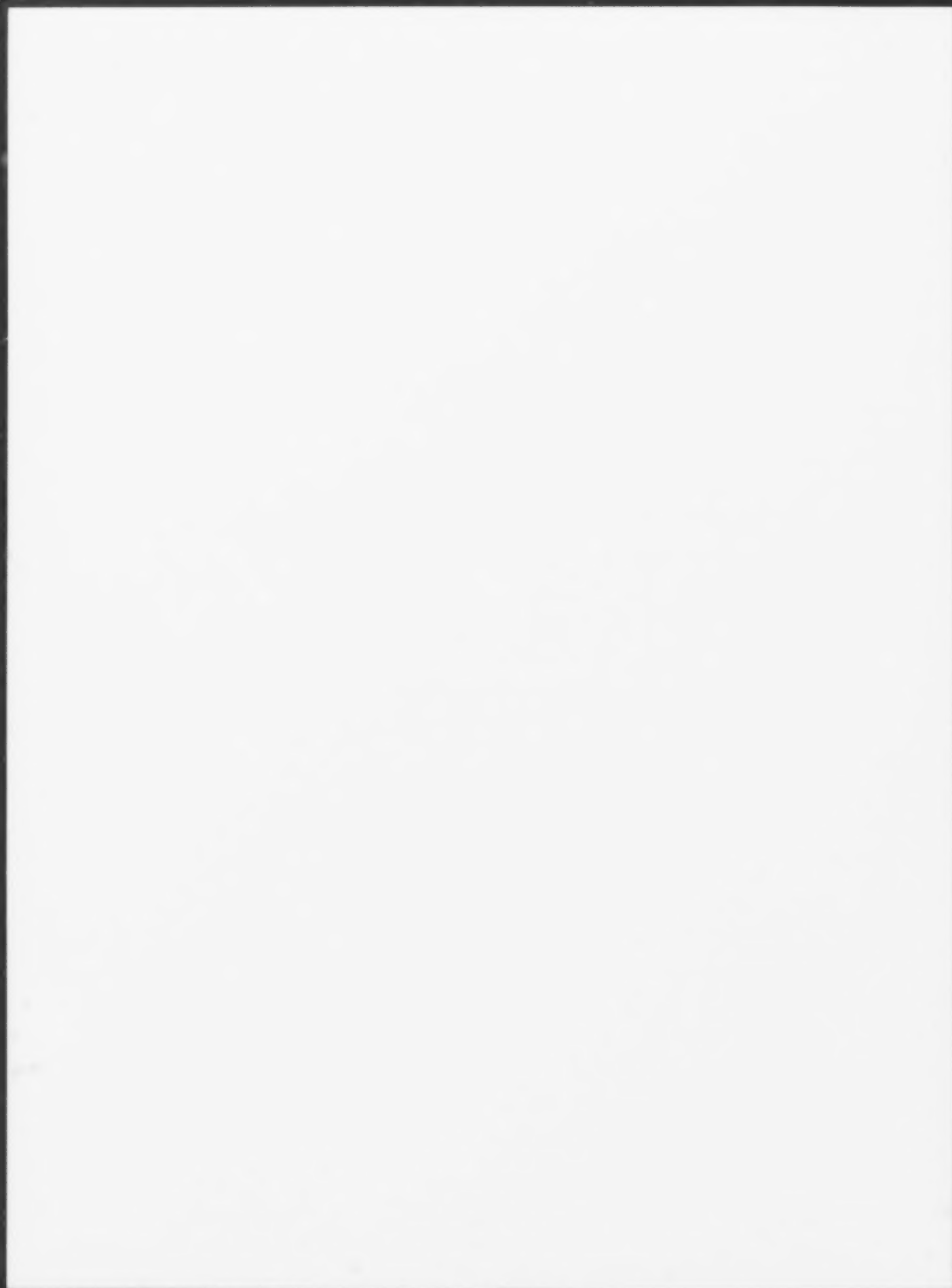


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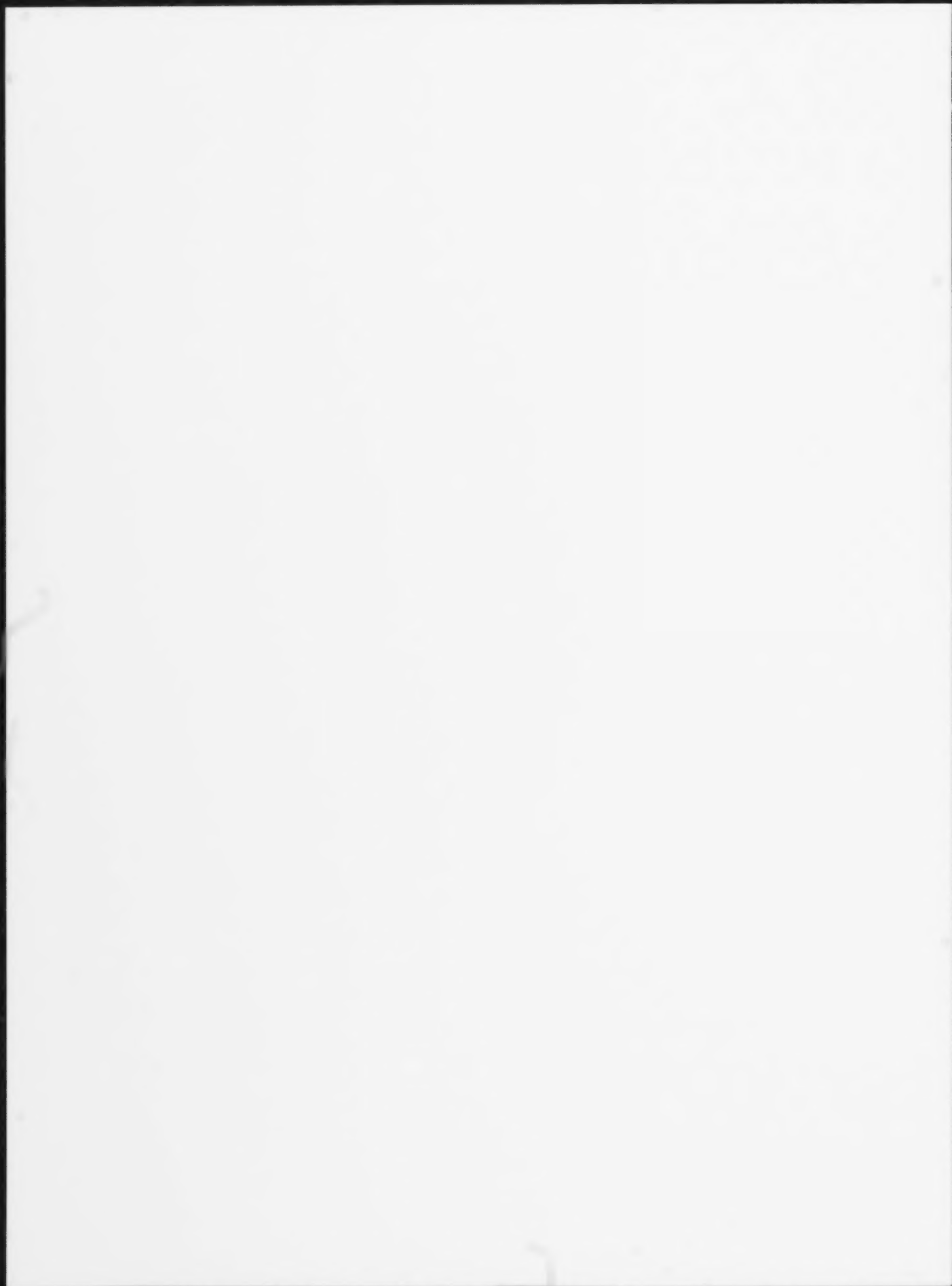
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GUIDE TO ANALYSIS



DEVELOPMENT OF ANALYSIS

A draft analysis is developed by a knowledgeable consultant who, with the assistance of a committee of industry experts in the field, identifies all the tasks performed in the occupation.

The draft is then assigned to occupational analysts at Human Resources and Social Development Canada (HRSDC) for translation and then returned to the consultant for review to ensure conformity with the nationally approved format.

The consultant then forwards a copy of this analysis to provincial/territorial authorities for validation by specialists in the field. Their recommendations are assessed and incorporated into the final draft which also includes the identification of the common core tasks performed in the occupation.

The occupational analysis is published in both official languages.

STRUCTURE OF ANALYSIS

To facilitate understanding of the nature of the occupation, the work performed is divided into the following divisions:

- | | |
|-----------------|---|
| BLOCK | – is the largest division within the analysis and reflects a distinct operation relevant to the occupation. |
| TASK | – is the distinct activity that, combined with others, makes up the logical and necessary steps the worker is required to perform to complete a specific assignment within a "BLOCK". |
| SUB-TASK | – is the smallest division into which it is practical to subdivide any work activity and, combined with others, fully describes all duties constituting a "TASK". |

Supporting Knowledge & Abilities

The elements of skill and knowledge that an individual must acquire to adequately perform the sub-task.

Trends

Any shifts or changes in technology that affect the block.

Related Components

All components related to a specified task being undertaken by the Ironworker (Generalist).

Tools and Equipment

All tools and equipment necessary for the Ironworker (Generalist) to perform the work on all given tasks.

VALIDATION METHOD

At the request of the Canadian Council of Directors of Apprenticeship (CCDA), the Standardization Subcommittee developed a method for validating the Red Seal National Occupational Analyses.

A draft of the analysis is sent to all provinces/territories for validation. Each jurisdiction rates the sub-tasks and applies percentage ratings to blocks and tasks. This method for the validation of the National Occupational Analysis identifies common core tasks across Canada for a specific occupation. This feature facilitates the weighting of the Interprovincial Standards "Red Seal" Examinations.

DEFINITIONS

- YES:** the sub-task is performed by workers in the occupation in a specific jurisdiction.
- NO:** the sub-task is not performed by workers in the occupation in a specific jurisdiction.
- BLOCK %:** the average number of questions (items), derived from the collective decision made by workers within the occupation from all areas of Canada, that will be placed on an interprovincial examination to assess each block of the analysis.
- TASK %:** the average number of questions (items), derived from the collective decision made by workers within the occupation from all areas of Canada, that will be placed on an interprovincial examination to assess each task of the analysis.
- NV:** Not Validated by a province/territory.
- ND:** Not Designated in a province/territory.

PROVINCIAL/TERRITORIAL ABBREVIATIONS

- NL:** Newfoundland and Labrador
- NS:** Nova Scotia
- PE:** Prince Edward Island
- NB:** New Brunswick
- QC:** Quebec
- ON:** Ontario
- MB:** Manitoba
- SK:** Saskatchewan
- AB:** Alberta
- BC:** British Columbia
- NT:** Northwest Territories
- YT:** Yukon
- NU:** Nunavut

COMMON CORE

The criteria for determining common core depend on the performance of sub-tasks. If at least 70% of the responding jurisdictions (excluding NVs and NDs) perform a sub-task, it shall be considered common core.

Interprovincial Standards "Red Seal" Examinations are based on the common core identified through this validation process. This process identifies what will be assessed through the interprovincial examination.

BLOCKS AND TASKS WEIGHTING (APPENDIX D)

This appendix represents the block and task percentages as submitted by each jurisdiction.

Each jurisdiction, with the use of a provincial/territorial occupational advisory committee, validates the content, places percentages on blocks and tasks, and indicates whether or not the sub-tasks are performed by the skilled workers within the occupation. The results of this exercise are submitted to the consultant who then analyzes the data and develops this appendix which provides the individual jurisdictional validation results as well as the national averages of all responses.

PIE CHART (APPENDIX E)

The graph depicts the national percentages assigned to blocks in the analysis.

SCOPE OF THE IRONWORKER (GENERALIST) OCCUPATION

Ironworkers (generalists) work with both structural/ornamental and reinforcing steel materials. They install structural/ornamental steel components, precast concrete members and glued laminated timber products (glulam) and place reinforcing steel in commercial, industrial, institutional and large residential buildings, towers, bridges and stadiums. They erect pre-engineered buildings and ornamental ironwork such as curtain walls, metal stairways, catwalks, railings and metal doors.

Ironworkers (generalists) cut, bend, lay out and place reinforcing steel rods, welded wire fabric and composite materials in a wide variety of poured concrete products and structures such as buildings, highways, bridges, stadiums and towers. While reinforcing material is usually pre-cut and fabricated off-site, ironworkers (generalists) may be called upon to cut and bend them according to design specifications and drawings. They may pre-assemble reinforcing material by laying it out and connecting sub-assemblies on the ground prior to final placement. They position, align and secure components according to drawings, using a variety of methods. They also place and stress various post-tensioning systems in structures such as parking garages, bridges and stadiums where longer unsupported spans are required. After placing post-tensioning systems, they stress the tendons to predetermined specifications using hydraulic jacks and pumps.

Ironworkers (generalists) prepare the site by assembling the hoisting equipment and erecting scaffolding, cranes, hoists and derricks on the construction site. They unload structural, ornamental, reinforcing materials and organize the material for installation. They connect cables and slings to the components and direct crane operators in lifts. They position, align and secure components according to blueprints using a variety of fastening methods. They also install conveyors, machinery and automated material handling systems. They are also involved in demolition and salvage duties involving all types of construction.

Ironworkers (generalists) generally work outside in all weather, although some work indoors in manufacturing plants or underground work sites. Work sites may be in a variety of locations ranging from remote areas where they could be working on dams, bridges or mining projects to urban environments where they could work on high-rise buildings, parking garages, transit systems, tunnels or stadiums.

The work often requires considerable standing, bending, crawling, lifting, climbing, pulling and reaching, and is often conducted in cramped, confined spaces or at heights. Hazards include injury from electrocution, falls or falling objects. Inclement weather may shut down projects for extended periods and deadlines and priorities may involve overtime.

Ironworkers (generalists) are required to have good mechanical aptitude, the ability to visualize finished products in three dimensions, the ability to maintain balance working at heights in varying extreme climates. A thorough knowledge of the principles of lifting and hoisting is required as is a familiarity with a variety of metal fastening and joining methods. They are also required to be competent in the use and care of a variety of hand and power tools and equipment such as tying tools, pry bars, jacks, torches, cut-off saws, hydraulic benders, shears, welding equipment, stressing equipment and cranes. They also use crane charts and must be able to estimate and reconcile crane ability with load sizes.

Because of the nature of the work ironworkers (generalists) must be thoroughly familiar with the applicable sections of local, provincial and federal building and safety standards.

Ironworkers (generalists) tend to work in teams and with other tradespeople and team coordination is a large component of the occupation especially when hoisting and placing large, heavy components high above the ground.

OCCUPATIONAL OBSERVATIONS

Technology continues to contribute to many changes in equipment design and construction materials. These innovations require constantly changing methods and techniques governed by appropriate attitudes towards the current high standards for fabrication, erection and installation of structural and ornamental components. Maintaining updated knowledge of these changes presents a daily challenge to the people of this trade.

The work of an ironworker (generalist), by its nature, possesses inherent hazards. Safe work procedures, best practices and job hazard analysis assist in controlling or eliminating hazards. However, errors in judgment or in practical application of trade knowledge can be costly, both in terms of injury to workers and damage to equipment or materials. Workers must maintain constant attention to the application of safety and accident prevention at all times.

Personal protective equipment such as fall arrest equipment, aerial work platforms, breathing apparatus and fume extraction equipment have become an integral part of all worksites and places of employment.

Ironworkers (generalists) are increasingly being called on to document and maintain records due to more stringent laws and regulations. The end products in industrial and other applications must be appropriately installed, inspected and documented. This places more responsibility on supervisors, quality control personnel and the individuals who perform the installation and assembly of components. The tremendous variety in equipment and methods means that the ironworker (generalist) must be more knowledgeable and adaptable than ever before.

SAFETY

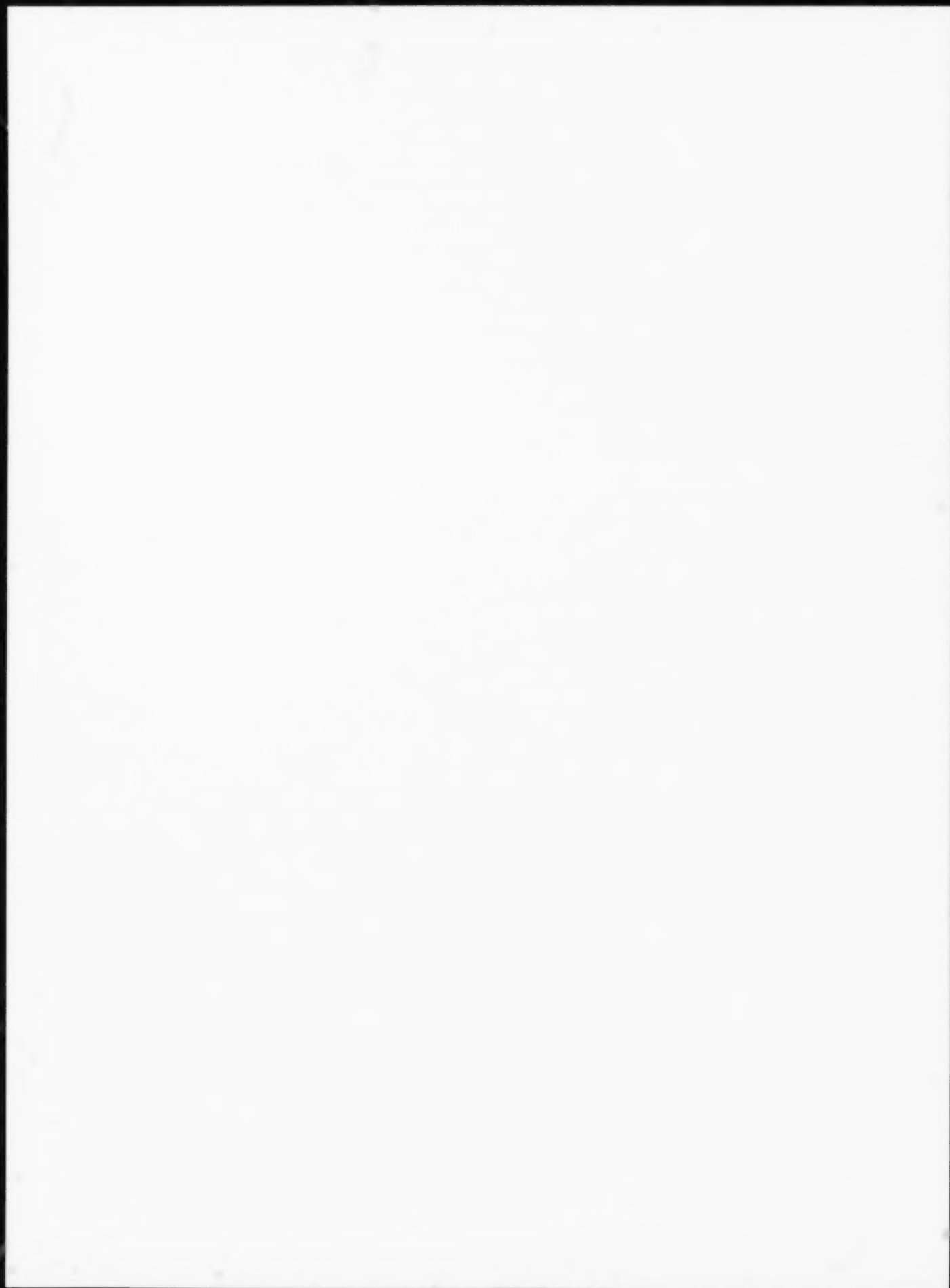
Safe working procedures and conditions, accident prevention and the preservation of health are of primary importance to industry in Canada. These responsibilities are shared and require the joint efforts of government, employers and employees. It is imperative that all parties are aware of circumstances and conditions that may lead to injury or harm. Safe learning experiences and environments can be created by controlling the variables and behaviours that may contribute to accidents or injury.

It is generally recognized that a safety-conscious attitude and work practices contribute to a healthy, safe and accident-free working environment.

It is imperative to apply and be familiar with the Occupational Health and Safety Acts and Workplace Hazardous Material Information System (WHMIS) Regulations. As well, it is essential to determine workplace hazards and take measures to protect oneself, co-workers, the public and the environment.

As safety education is an integral part of training in all jurisdictions, personal safety practices are not recorded in this document. However, the technical safety aspect relating to each task and sub-task are included throughout this analysis.

ANALYSIS



BLOCK A

OCCUPATIONAL SKILLS

Trends: There is greater emphasis on training and retraining of ironworkers (generalists). There is also a greater awareness of safety and safer working conditions and an increased emphasis on job coordination and scheduling. Also, there have been significant changes in the engineering and technology of ironworker (generalist) tools and equipment such as laser levels and electronic measuring instruments. Elevated work platforms are increasingly being used.

Task 1 Interprets occupational documentation.

Related Components: Drawings (structural, architectural, mechanical, engineering, detail and layout), codes [American National Standards Institute (ANSI), Canadian Standards Association (CSA), Concrete Reinforcing Steel Institute (CRSI), and Workplace Hazardous Materials Information System (WHMIS)], specifications, shipping documentation, manufacturers' manuals and occupational health and safety (OH&S) legislation.

Tools and Equipment: Architectural scales, calculator, measuring tape.

Sub-task

1.01 Interprets drawings and specifications.

Supporting Knowledge & Abilities

<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>
yes	yes	NV	yes	ND	yes	yes	yes	yes	yes	ND	ND	ND
					1.01.01		knowledge of types of drawings such as structural erection, architectural, pre-cast shop and fabrication					
					1.01.02		knowledge of welding symbols					
					1.01.03		knowledge of abbreviations and technical vocabulary					
					1.01.04		knowledge of drafting techniques					

1.01.05	ability to interpret drawing symbols
1.01.06	ability to correlate types of drawings such as structural drawings, architectural drawings, engineering drawings, detail drawings and erection drawings
1.01.07	ability to distinguish types of views
1.01.08	ability to relate drawings to worksite

Sub-task

1.02 Interprets standards, regulations and procedures.

Supporting Knowledge & Abilities

<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>
yes	yes	NV	yes	ND	yes	yes	yes	yes	yes	ND	ND	ND

1.02.01	knowledge of standards such as CSA, ANSI and CRSI
1.02.02	knowledge of regulations such as OH&S Act, Workplace Hazardous Materials Information System (WHMIS) and fall protection
1.02.03	knowledge of the location of standards, regulations and procedures
1.02.04	ability to apply procedures such as welding, assembly, placing, tensioning and grouting

Task 2 Communicates in the workplace.

Related Components: Manufacturers' documentation, manuals, record books.

Tools and Equipment: Communication devices (fax, cellular phone, telephone, photocopier, computer, radio, cameras, headsets, two-way radios, printers), flags.

Sub-task

2.01 Communicates with co-workers.

Supporting Knowledge & Abilities

<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>
yes	yes	NV	yes	ND	yes	yes	yes	yes	yes	ND	ND	ND

2.01.01	knowledge of types of communication
2.01.02	knowledge of interpersonal communication techniques
2.01.03	knowledge of trade vocabulary
2.01.04	knowledge of barriers to communication
2.01.05	ability to write clearly and concisely
2.01.06	ability to actively listen
2.01.07	ability to check to confirm understanding

Sub-task

2.02 Communicates with other disciplines.

Supporting Knowledge & Abilities

<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>
yes	yes	NV	yes	ND	yes	yes	yes	yes	yes	ND	ND	ND

2.02.01	knowledge of job-related terminology
2.02.02	knowledge of report formats
2.02.03	ability to actively listen
2.02.04	ability to translate technical terms into layperson language
2.02.05	ability to address others' concerns
2.02.06	ability to write reports in prescribed formats
2.02.07	ability to check to confirm understanding

Sub-task

2.03 Communicates with apprentices.

Supporting Knowledge & Abilities

<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>
yes	yes	NV	yes	ND	yes	yes	yes	yes	yes	ND	ND	ND

- 2.03.01 knowledge of capability of apprentice
- 2.03.02 ability to listen, teach, coach and mentor
- 2.03.03 ability to supervise
- 2.03.04 ability to assess and record ongoing progress

Sub-task

2.04 Uses hand signals.

Supporting Knowledge & Abilities

<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>
yes	yes	NV	yes	ND	yes	yes	yes	yes	yes	ND	ND	ND

- 2.04.01 knowledge of types of signals
- 2.04.02 knowledge of hand signals
- 2.04.03 knowledge of signal terminology
- 2.04.04 ability to select types of signals
- 2.04.05 ability to interpret signals
- 2.04.06 ability to select signals for type of equipment

Sub-task**2.05 Communicates electronically. Supporting Knowledge & Abilities**

<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>
yes	yes	NV	yes	ND	yes	yes	yes	yes	yes	ND	ND	ND

2.05.01	knowledge of types of electronic communication devices such as cellular telephones, two-way radios and lap-top computers
2.05.02	knowledge of communication protocols and company reporting policies
2.05.03	ability to operate electronic communication devices
2.05.04	ability to send, receive and retrieve information from computers
2.05.05	ability to communicate through two-way radios and cellular phones

Task 3 Uses and maintains tools and equipment.

Related Components: Manufacturers' manuals, cleaning supplies, lubricating supplies.

Tools and Equipment: See Appendix A.

Sub-task**3.01 Uses hand tools. Supporting Knowledge & Abilities**

<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>
yes	yes	NV	yes	ND	yes	yes	yes	yes	yes	ND	ND	ND

3.01.01	knowledge of types and uses of hand tools
3.01.02	knowledge of hand tool safety
3.01.03	knowledge of manufacturers' specifications on the use and care of hand tools
3.01.04	knowledge of types of measuring equipment

3.01.05	ability to select hand tools required for a task
3.01.06	ability to identify damaged, worn or otherwise unsafe hand tools
3.01.07	ability to clean and store hand tools
3.01.08	ability to maintain hand tools

Sub-task

3.02 Uses power tools.

Supporting Knowledge & Abilities

<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>
yes	yes	NV	yes	ND	yes	yes	yes	yes	yes	ND	ND	ND

3.02.01	knowledge of types and uses of power tools such as pneumatic, electric, gas powered and hydraulic
3.02.02	knowledge of power tool components
3.02.03	knowledge of operating procedures for power tools
3.02.04	knowledge of power tool safety
3.02.05	knowledge of manufacturers' recommended uses, limitations and maintenance of power tools
3.02.06	ability to select power tools required for a task
3.02.07	ability to identify damaged, worn or otherwise unsafe power tools
3.02.08	ability to clean and store power tools
3.02.09	ability to maintain power tools

Sub-task**3.03 Uses bending tools and equipment.****Supporting Knowledge & Abilities**

<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>
yes	yes	NV	yes	ND	yes	yes	yes	yes	yes	ND	ND	ND

- | | |
|---------|---|
| 3.03.01 | knowledge of types and uses of bending equipment |
| 3.03.02 | knowledge of manufacturers' recommended uses and limitations |
| 3.03.03 | knowledge of potential hazards and safety issues |
| 3.03.04 | ability to select bending equipment |
| 3.03.05 | ability to set up and calibrate bending equipment |
| 3.03.06 | ability to identify damaged, worn or otherwise unsafe bending equipment |

Sub-task**3.04 Uses powder-actuated tools.****Supporting Knowledge & Abilities**

<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>
yes	yes	NV	yes	ND	yes	yes	yes	yes	yes	ND	ND	ND

- | | |
|---------|--|
| 3.04.01 | knowledge of types and uses of powder-actuated tools |
| 3.04.02 | knowledge of powder-actuated tool components |
| 3.04.03 | knowledge of operating procedures for powder-actuated tools |
| 3.04.04 | knowledge of powder-actuated tool safety |
| 3.04.05 | knowledge of manufacturers' recommended uses and limitations |

3.04.06	knowledge of licensing or training requirements prior to the use of powder-actuated tools
3.04.07	ability to select powder-actuated charges and fasteners required for a task
3.04.08	ability to identify damaged, worn or otherwise unsafe powder-actuated tools
3.04.09	ability to clean and lubricate powder-actuated tools
3.04.10	ability to store powder-actuated tools

Sub-task

3.05 Uses aerial work platforms.

Supporting Knowledge & Abilities

<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>
yes	yes	NV	yes	ND	yes	yes	yes	yes	yes	ND	ND	ND
					3.05.01		knowledge of types and uses of aerial work platforms					
					3.05.02		knowledge of aerial work platform safety					
					3.05.03		knowledge of aerial work platform regulations and certification requirements					
					3.05.04		knowledge of aerial work platform components and accessories					
					3.05.05		knowledge of operating procedures of aerial work platforms					
					3.05.06		knowledge of manufacturers' specifications for use of aerial work platforms					
					3.05.07		ability to identify damaged, worn or otherwise unsafe aerial work platforms and equipment					
					3.05.08		ability to position aerial work platforms					
					3.05.09		ability to store aerial work platforms					

Sub-task**3.06 Uses ladders.****Supporting Knowledge & Abilities**

<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>
yes	yes	NV	yes	ND	yes	yes	yes	yes	yes	ND	ND	ND
					3.06.01		knowledge of types and uses of ladders					
					3.06.02		knowledge of safe operating procedures for ladders					
					3.06.03		knowledge of manufacturers' specifications for use and care of ladders					
					3.06.04		ability to position ladders					
					3.06.05		ability to secure ladders					
					3.06.06		ability to dismantle and store ladders					
					3.06.07		ability to identify worn, damaged or otherwise unsafe ladders					

Sub-task**3.07 Uses scaffolding.****Supporting Knowledge & Abilities**

<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>
yes	yes	NV	yes	ND	yes	yes	yes	yes	yes	ND	ND	ND
					3.07.01		knowledge of regulations pertaining to scaffolding					
					3.07.02		knowledge of types of scaffolding					
					3.07.03		knowledge of installation and dismantling procedures					
					3.07.04		knowledge of manufacturers' recommended uses and limitations of scaffolding					
					3.07.05		ability to position and erect scaffolding and install planking, guardrails and toe plates					
					3.07.06		ability to secure scaffolding, planking, guardrails, toe plates and related components					

3.07.07	ability to dismantle and store scaffolding
3.07.08	ability to identify damaged, worn or otherwise unsafe scaffolding and planking

Sub-task

3.08 Uses personal protective equipment (PPE).

Supporting Knowledge & Abilities

<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>
yes	yes	NV	yes	ND	yes	yes	yes	yes	yes	ND	ND	ND

3.08.01	knowledge of types and uses of PPE such as hard hats, safety glasses, hearing protection, welding PPE, safety footwear and fall arrest equipment
3.08.02	knowledge of PPE safety
3.08.03	knowledge of manufacturers' recommended uses, limitations and maintenance of PPE
3.08.04	knowledge of workplace rules and regulations
3.08.05	ability to select PPE for conditions encountered
3.08.06	ability to use fall arrest equipment such as harnesses, safety belts and lines
3.08.07	ability to identify damaged, worn or otherwise unsafe PPE
3.08.08	ability to store PPE

Sub-task

3.09 Uses surveying equipment.

Supporting Knowledge & Abilities

<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>
yes	yes	NV	yes	ND	yes	yes	yes	yes	yes	ND	ND	ND

3.09.01	knowledge of types of layout instruments such as theodolite, transit, scales and laser level
---------	--

3.09.02	knowledge of measurement techniques
3.09.03	knowledge of blueprint interpretation
3.09.04	knowledge of marking techniques
3.09.05	ability to select equipment for a task
3.09.06	ability to calculate angles and distances
3.09.07	ability to transfer blueprint information to site
3.09.08	ability to set up and calibrate equipment
3.09.09	ability to store surveying equipment

Sub-task

3.10 Uses welding equipment.

Supporting Knowledge & Abilities

<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>
yes	yes	NV	yes	ND	yes	yes	yes	yes	yes	ND	ND	ND
					3.10.01		knowledge of provincial/territorial and applicable welding regulations					
					3.10.02		knowledge of Canadian Welding Bureau (CWB) standards					
					3.10.03		knowledge of welding processes and procedures					
					3.10.04		knowledge of welding symbols					
					3.10.05		knowledge of welding hazards					
					3.10.06		knowledge of welding equipment					
					3.10.07		knowledge of welding consumables					
					3.10.08		knowledge of welding defects					
					3.10.09		ability to set up welding equipment					
					3.10.10		ability to perform welding processes					
					3.10.11		ability to adjust welding parameters to suit site conditions					

3.10.12 ability to identify damaged, worn or otherwise unsafe welding equipment

3.10.13 ability to store welding equipment

Sub-task

3.11 Uses thermal and oxy-fuel cutting equipment.

Supporting Knowledge & Abilities

<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>
yes	yes	NV	yes	ND	yes	yes	yes	yes	yes	ND	ND	ND

3.11.01 knowledge of cutting processes

3.11.02 knowledge of cutting equipment

3.11.03 knowledge of cutting consumables

3.11.04 ability to set up equipment

3.11.05 ability to inspect equipment

3.11.06 ability to adjust cutting parameters

3.11.07 ability to recognize cutting hazards

3.11.08 ability to identify damaged, worn or otherwise unsafe cutting equipment

3.11.09 ability to store cutting equipment and consumables

Task 4 Organizes work.

Related Components: Company standards, safety manuals, company policies, procedures and regulations, schedules/calendars, drawings, specifications.

Tools and Equipment: See Appendix A.

Sub-task

4.01 Organizes materials and supplies.

Supporting Knowledge & Abilities

<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>
yes	yes	NV	yes	ND	yes	yes	yes	yes	yes	ND	ND	ND

- | | |
|---------|--|
| 4.01.01 | knowledge of erection sequence |
| 4.01.02 | knowledge of placing and assembly |
| 4.01.03 | knowledge of equipment capabilities and limitations |
| 4.01.04 | knowledge of site preparation |
| 4.01.05 | knowledge of shipping documentation |
| 4.01.06 | knowledge of storage principles |
| 4.01.07 | ability to schedule material and supplies required for job |
| 4.01.08 | ability to unload equipment |
| 4.01.09 | ability to place and sort materials and supplies |
| 4.01.10 | ability to reconcile load with shipping documents |
| 4.01.11 | ability to secure equipment and materials |

Sub-task

4.02 Marks layouts.

Supporting Knowledge & Abilities

<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>
yes	yes	NV	yes	ND	yes	yes	yes	yes	yes	ND	ND	ND

4.02.01	knowledge of drawings
4.02.02	ability to interpret drawings
4.02.03	ability to use measuring devices and layout tools
4.02.04	ability to apply marking and layout techniques
4.02.05	ability to visualize finished product
4.02.06	ability to transfer drawing information to accommodate site conditions

Sub-task

4.03 Maintains safe work environment.

Supporting Knowledge & Abilities

<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>
yes	yes	NV	yes	ND	yes	yes	yes	yes	yes	ND	ND	ND

4.03.01	knowledge of safety regulations
4.03.02	knowledge of building codes
4.03.03	knowledge of applications of safety equipment such as fall arrest, fall restraint and work positioning
4.03.04	knowledge of safe work practices and limitations
4.03.05	ability to apply safety standards applicable to workplace

- 4.03.06 ability to install safety equipment such as guard rails, static lines, lifelines, screens, temporary flooring, warning signs and barriers
- 4.03.07 ability to maintain good housekeeping

Sub-task

4.04 Assesses site hazards.

Supporting Knowledge & Abilities

<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>
yes	yes	NV	yes	ND	yes	yes	yes	yes	yes	ND	ND	ND

- 4.04.01 knowledge of policies and procedures
- 4.04.02 knowledge of codes and procedures
- 4.04.03 ability to recognize hazards such as floor openings, leading edges and obstructions
- 4.04.04 ability to control hazards

Sub-task

4.05 Plans work tasks.

Supporting Knowledge & Abilities

<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>
yes	yes	NV	yes	ND	yes	yes	yes	yes	yes	ND	ND	ND

- 4.05.01 knowledge of specifications and drawings
- 4.05.02 ability to interpret specifications and drawings
- 4.05.03 ability to improvise to suit site conditions
- 4.05.04 ability to maintain schedule
- 4.05.05 ability to select materials and supplies required for task
- 4.05.06 ability to select equipment and tools required for task

BLOCK B

RIGGING AND HOISTING

Trends: The occupation has seen an increase in the development and deployment of new technologies such as specialty rigging and the use of synthetic materials. The occupation has seen the increased presence of comprehensive regulations, especially in regard to the use of heavy mobile equipment.

Task 5 Selects rigging equipment.

Related Components: Chokers, slings, chains, hooks, shackles, thimbles, guys, clips, wire rope, spreader bar, balance beam, equalizer beam, blocks, fibre rope, cable puller, softener, charts.

Tools and Equipment: Hand tools, standard tools, PPE, rope and cable tugger, calculator, vernier calipers, marlinspike.

Sub-task

5.01 Matches load to lift capability.

Supporting Knowledge & Abilities

<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>
yes	yes	NV	yes	ND	yes	yes	yes	yes	yes	ND	ND	ND

5.01.01	knowledge of types of lifting equipment such as hydraulic jacks, fork lifts, air pallets, pallet jacks and rollers
5.01.02	knowledge of the capacity of lifting equipment
5.01.03	knowledge of basic geometry
5.01.04	knowledge of weights and measures
5.01.05	ability to calculate weights of loads
5.01.06	ability to select rigging equipment
5.01.07	ability to calculate choker tension based on choker angle and load

Sub-task**5.02 Inspects rigging equipment.****Supporting Knowledge & Abilities**

<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>
yes	yes	NV	yes	ND	yes	yes	yes	yes	yes	ND	ND	ND

5.02.01	knowledge of types of rigging equipment
5.02.02	knowledge of manufacturers' specifications
5.02.03	knowledge of policies and procedures
5.02.04	knowledge of tools and materials
5.02.05	ability to identify defects
5.02.06	ability to report defects

Sub-task**5.03 Maintains rigging equipment.****Supporting Knowledge & Abilities**

<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>
yes	yes	NV	yes	ND	yes	yes	yes	yes	yes	ND	ND	ND

5.03.01	knowledge of types of rigging equipment
5.03.02	knowledge of manufacturers' specifications
5.03.03	knowledge of policies and procedures
5.03.04	knowledge of tools and materials
5.03.05	ability to perform maintenance procedures
5.03.06	ability to store rigging equipment

Task 6 Uses hoisting and lifting equipment.

Related Components: Structural members, conveyors, machinery, curtain walls, platforms, pre-fabricated components.

Tools and Equipment: Hand tools, boom truck, zoom boom, come-alongs, hydraulic jacks, chain block hoist, tugger, fork lift, rollers, air pallets, bents, form boom, dunnage, derricks, strand jack system, carry deck.

Sub-task**6.01 Uses hoisting equipment.****Supporting Knowledge & Abilities**

<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>
yes	yes	NV	yes	ND	yes	yes	yes	yes	yes	ND	ND	ND

6.01.01	knowledge of provincial/territorial and applicable regulations and certification requirements
6.01.02	knowledge of types of hoisting equipment such as come-alongs, grip hoist, chain block hoists, tuggers and derricks
6.01.03	knowledge of anchorage locations and capabilities
6.01.04	knowledge of policies and procedures
6.01.05	ability to select hoisting equipment
6.01.06	ability to select anchorage locations
6.01.07	ability to follow manufacturers' specifications

Sub-task**6.02 Uses lifting equipment.****Supporting Knowledge & Abilities**

<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>
yes	yes	NV	yes	ND	yes	yes	yes	yes	yes	ND	ND	ND

6.02.01	knowledge of types of lifting equipment such as hydraulic jacks, fork lifts and air pallets
6.02.02	knowledge of policies and procedures

- 6.02.03 ability to select lifting equipment
- 6.02.04 ability to follow manufacturers' specifications and recommendations

Sub-task

6.03 Attaches rigging to load.

Supporting Knowledge & Abilities

<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>
yes	yes	NV	yes	ND	yes	yes	yes	yes	yes	ND	ND	ND

- 6.03.01 knowledge of hoisting procedures such as engineer's plan, multi-member and tandem lift
- 6.03.02 knowledge of placement and attachment location
- 6.03.03 knowledge of hoisting specifications
- 6.03.04 ability to select lifting procedures
- 6.03.05 ability to use and tie knots, bends and hitches
- 6.03.06 ability to follow rigging procedures
- 6.03.07 ability to use rigging equipment

BLOCK C

CRANES

Trends: Modern cranes have greater lifting capacity and are more precise in the positioning of their loads, often within millimetres of specifications. The erection of cranes has also become more automatic, with modern cranes greatly assisting in their own erection.

Task 7 Assembles and erects cranes.

Related Components: Mats, pads, dunnage, boom sections and jib, counterweight, pins and cotter pins, bolts, blocks and sheaves, headache ball, hook, wedge socket bridle, mast, outriggers, gantry, cable components (pendant lines, jib lines, guide lines, load lines).

Tools and Equipment: Sledge hammer, back-out hammer (B & O hammer), wrenches, pry bars, rigging hardware, PPE, pliers, assist cranes, hand tools, types of cranes (rough terrain cranes, all terrain, crawler, hydraulic, tower, boom, electric overhead travelling (EOT), heavy lift, gantries, knuckle boom), specialty heavy lift components. Also see Appendix A.

Sub-task

7.01 Assesses site hazards.

Supporting Knowledge & Abilities

<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>
yes	yes	NV	yes	ND	yes	yes	yes	yes	yes	ND	ND	ND

7.01.01	knowledge of types of hazards such as overhead power lines, underground services, other workers and obstructions to swing radius
7.01.02	knowledge of swing area (radius) of crane
7.01.03	ability to calculate crane radius
7.01.04	ability to identify potential hazards
7.01.05	ability to read load charts

Sub-task**7.02 Determines crane position.****Supporting Knowledge & Abilities**

<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>
yes	yes	NV	yes	ND	yes	yes	yes	yes	yes	ND	ND	ND

7.02.01	knowledge of crane types
7.02.02	knowledge of crane capacity
7.02.03	knowledge of crane radius
7.02.04	knowledge of maximum weight of lifts
7.02.05	knowledge of crane limitations due to inclement weather
7.02.06	ability to determine weights of components
7.02.07	ability to calculate the available headroom
7.02.08	ability to select crane for required task
7.02.09	ability to minimize overhead dangers

Sub-task**7.03 Prepares bases.****Supporting Knowledge & Abilities**

<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>
yes	yes	NV	yes	ND	yes	yes	yes	yes	yes	ND	ND	ND

7.03.01	knowledge of gross weight of crane
7.03.02	knowledge of composition of base such as soil, concrete and steel
7.03.03	knowledge of types of pads
7.03.04	ability to select pads such as mats, dunnage and cribbing
7.03.05	ability to visually assess ground conditions

7.03.06	ability to ensure ground is stable and level
7.03.07	ability to install falsework

Sub-task

7.04 Erects cranes.

Supporting Knowledge & Abilities

<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>
yes	yes	NV	yes	ND	yes	yes	yes	yes	yes	ND	ND	ND
					7.04.01		knowledge of sequence of assembly					
					7.04.02		knowledge of crane components such as boom sections, counterweights and jibs					
					7.04.03		knowledge of crane signals					
					7.04.04		knowledge of tools used in assembly and erection of cranes					
					7.04.05		knowledge of safe rigging practices					
					7.04.06		ability to ensure adequate space for assembly					
					7.04.07		ability to install components					
					7.04.08		ability to reeve/lace blocks					
					7.04.09		ability to participate in engineered (critical) lifts					
					7.04.10		ability to finalize set-up					

Task 8 Disassembles cranes.

Related Components: Falsework, mats, pads, dunnage, boom sections and jib, counterweight, pins and cotter pins, bolts, blocks and sheaves, drums and tracks, headache ball, hook, wedge socket bridle, mast, outriggers, gantries, rail tracks, cable components (pendant lines, jib lines, guide lines, load lines).

Tools and Equipment: Sledge hammer, B & O hammer, wrenches, pry bars, rigging hardware, jacks and rollers, pliers, PPE, assist cranes (rough terrain, all terrain, crawler, hydraulic, tower, boom, electric overhead travelling (EOT), gantries, knuckle boom).

Sub-task**8.01 Disassembles crane components.****Supporting Knowledge & Abilities**

<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>
yes	yes	NV	yes	ND	yes	yes	yes	yes	yes	ND	ND	ND

- | | |
|---------|--|
| 8.01.01 | knowledge of method of disassembly |
| 8.01.02 | knowledge of sequence of disassembly |
| 8.01.03 | knowledge of equipment and tools required for task |
| 8.01.04 | knowledge of rigging |
| 8.01.05 | ability to recognize hazards of disassembly such as tensioned pins and overloads |
| 8.01.06 | ability to disconnect components |
| 8.01.07 | ability to direct crane operator |
| 8.01.08 | ability to rig crane components |
| 8.01.09 | ability to block boom sections |

Sub-task**8.02 Prepares crane for transport.****Supporting Knowledge & Abilities**

<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>
yes	yes	NV	yes	ND	yes	yes	yes	yes	yes	ND	ND	ND

- | | |
|---------|---|
| 8.02.01 | knowledge of safe rigging practices |
| 8.02.02 | ability to select type of rigging |
| 8.02.03 | ability to place and secure components on transportation deck |

BLOCK D

REINFORCING

Trends: The occupation has seen the increased development and use of composite materials such as stainless steel tendons. New technologies are being developed and introduced to the occupation allowing for greater automation such as automated benders and tiers. More intricate and elaborate, non-linear building design has led to an increase in creative and innovative reinforcing techniques. The occupation has also seen an increase in the demand for compliance to new seismic codes.

Task 9 Fabricates on-site.

Related Components: Rebar, welded wire mesh fabric, composite materials, tie wire, bar supports (bolsters, chairs and concrete blocks), dunnage, couplers, coupling devices.

Tools and Equipment: Sledge hammer, pliers, cutters, quick-cut saws, measuring tape, chalk, shears, bolt cutters, hickey, power wrench, pneumatic gun, portable grinder, rebar bender, power bender, hammer drill, rigging equipment, cutting torch, come-alongs, Tifors, wire reel, work positioning hook.

Sub-task

9.01 Cuts material.

Supporting Knowledge & Abilities

<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>
yes	yes	NV	yes	ND	yes	yes	yes	yes	yes	ND	ND	ND

9.01.01	knowledge of reinforcing material such as rebar, welded wire mesh fabric and composite material
9.01.02	knowledge of material specifications
9.01.03	knowledge of cutting techniques
9.01.04	ability to measure and mark material for cutting

Sub-task**9.02 Bends material.****Supporting Knowledge & Abilities**

<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>
yes	yes	NV	yes	ND	yes	yes	yes	yes	yes	ND	ND	ND

9.02.01	knowledge of reinforcing material such as rebar, welded wire mesh fabric and composite material
9.02.02	knowledge of material specifications
9.02.03	knowledge of bending techniques
9.02.04	ability to measure and mark material for bending

Task 10 Installs reinforcing material.

Related Components: Rebar, welded wire mesh fabric, composite materials, tie wire, bar supports (bolsters, chairs and concrete blocks), dunnage, couplers, coupling devices.

Tools and Equipment: Hand tools (sledge hammer, pliers, cutters, measuring tape, chalk, shears, bolt cutters, hickey), quick-cut saws, power wrench, pneumatic gun, portable grinder, rebar bender, power bender, hammer drill, rigging equipment, cutting torch, come-alongs, wire reel, work positioning hook, fall arrest equipment.

Sub-task**10.01 Places reinforcing material.****Supporting Knowledge & Abilities**

<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>
yes	yes	NV	yes	ND	yes	yes	yes	yes	yes	ND	ND	ND

10.01.01	knowledge of reinforcing material such as rebar, welded wire mesh fabric and composite material
10.01.02	knowledge of installation sequencing such as laying out and placing ties and supports

10.01.03 knowledge of pre-assembly and pre-fabrication procedures

10.01.04 ability to apply manual and mechanical lifting and carrying techniques

Sub-task

10.02 Ties material.

Supporting Knowledge & Abilities

<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>
yes	yes	NV	yes	ND	yes	yes	yes	yes	yes	ND	ND	ND

10.02.01 knowledge of types of wire ties such as figure-8, snap tie and saddle tie

10.02.02 knowledge of tying specifications

10.02.03 knowledge of tying tools and equipment

10.02.04 knowledge of tying sequence

10.02.05 ability to select wire type and gauge depending on application

10.02.06 ability to tie variety of ties such as figure-8, snap tie and double wire tie

Sub-task

10.03 Joins material.

Supporting Knowledge & Abilities

<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>
yes	yes	NV	yes	ND	yes	yes	yes	yes	yes	ND	ND	ND

10.03.01 knowledge of provincial/territorial and applicable welding regulations

10.03.02 knowledge of welding techniques

10.03.03 knowledge of splicing techniques

10.03.04 knowledge of mechanical splicing techniques

- 10.03.05 knowledge of specialty anchoring systems and their installation
- 10.03.06 ability to select joining tools and equipment
- 10.03.07 ability to operate joining tools and equipment

BLOCK E

PRE-STRESSES/POST-TENSIONS

Trends: The occupation has seen an increase in the use of composite materials resulting in changes to the pre-stressed and post-stressed tensioning systems. An increased awareness of environmental concerns has resulted in the development of new handling techniques and procedures. Due to the aging of major structures nationwide, the occupation continues to see an increase in repair and restoration. Advancements in technology have allowed for the construction of longer spans and larger open spaces.

Task 11 Places pre-stressed/post-tensioning systems.

Related Components: Bulkheads, coils, anchors (barrel, cable), pocket former, cable tendons, bar tendons dead heads, trumpets, trumplates, wedges, wedge plates, blocks, duct, duct tape, bursting steel components, couplers, bearing plate, grout.

Tools and Equipment: Measuring tape, marking tools (crayons, soapstone, pencil), threaded rod, nuts, bolts, setting tools, grease, caulking, carousel, cable feeder, hammer, heat shrink, cutting tools, drill bits, pliers, wrenches, sockets, tie wire, knife, tiger torch, winches, air tugger.

Sub-task

11.01 Lays out profile.

Supporting Knowledge & Abilities

<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>
yes	yes	NV	yes	ND	yes	yes	yes	yes	yes	ND	ND	ND

11.01.01	knowledge of types of pre-stressed/post-tensioning systems such as bonded, cable and un-bonded
11.01.02	knowledge of pre-stressed/post-tensioning materials such as strand, bar and anchors
11.01.03	knowledge of pre-stressed/post-tensioning installation practices
11.01.04	knowledge of placement tolerances of ductwork and supports
11.01.05	knowledge of benchmarks and elevations

11.01.06 knowledge of measuring systems such as metric and imperial

11.01.07 ability to lay out duct and tendon position

Sub-task

11.02 Places tendons and accessories.

Supporting Knowledge & Abilities

<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>
yes	yes	NV	yes	ND	yes	yes	yes	yes	yes	ND	ND	ND

11.02.01 knowledge of types of pre-stressed/post-tensioning systems such as bonded, cable and un-bonded

11.02.02 knowledge of pre-stressed/post-tensioning materials such as strand, bar and anchors

11.02.03 knowledge of pre-stressed/post-tensioning installation practices

11.02.04 knowledge of pre-stressed/post-tensioning installation sequences

11.02.05 knowledge of tolerances

11.02.06 ability to position tendons and accessories

11.02.07 ability to secure tendons and accessories

11.02.08 ability to recognise and repair damage to ducts and tendons

11.02.09 ability to operate winching equipment

Sub-task

11.03 Installs bursting steel and anchorages.

Supporting Knowledge & Abilities

<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>
yes	yes	NV	yes	ND	yes	yes	yes	yes	yes	ND	ND	ND

11.03.01	knowledge of types of bursting steel
11.03.02	knowledge of types of anchorages
11.03.03	knowledge of types of components such as blocks, wedges, anchors and coils
11.03.04	knowledge of bursting steel and anchorage installation procedures and placing tolerances
11.03.05	knowledge of rebar tying methods
11.03.06	ability to place, modify and tie bursting steel
11.03.07	ability to install anchorages

Sub-task

11.04 Connects tendons to anchors.

Supporting Knowledge & Abilities

<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>
yes	yes	NV	yes	ND	yes	yes	yes	yes	yes	ND	ND	ND

11.04.01	knowledge of types of anchors such as barrel and cable
11.04.02	knowledge of types of tendons
11.04.03	knowledge of tendon and anchor connection procedures
11.04.04	knowledge of fastening techniques
11.04.05	ability to install anchors
11.04.06	ability to secure wedges

Sub-task

11.05 Protects exposed tendons.

Supporting Knowledge & Abilities

<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>
yes	yes	NV	yes	ND	yes	yes	yes	yes	yes	ND	ND	ND

11.05.01	knowledge of tendon protection materials such as duct tape, heat shrink and grease/caulking
11.05.02	knowledge of protection techniques
11.05.03	knowledge of potential contaminants
11.05.04	ability to select tendon protection material
11.05.05	ability to identify and correct faults
11.05.06	ability to install tendon protection

Task 12 Stresses tendons.

Related Components: Stressing plates, caps, tendons, ducts, anchorage, blocks, wedges, heat shrink, duct tape, lock nuts, bars.

Tools and Equipment: Hydraulic jacks and pumps, hoses, power cords, hoisting equipment, rigging equipment, stressing equipment, marking equipment, de-coiler, carousel, measuring equipment, chucks, wrenches, sockets, setting tools, couplers, hammers, fork lifts, scaffolding, come-alongs, chain falls, grip hoists dunnage, gauges, grinder, cut-off saw, safety barriers.

Sub-task

12.01 Sets up stressing equipment.

Supporting Knowledge & Abilities

<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>
yes	yes	NV	yes	ND	yes	yes	yes	yes	yes	ND	ND	ND

12.01.01	knowledge of types of stressing equipment
12.01.02	knowledge of stressing sequence
12.01.03	knowledge of limitations of equipment
12.01.04	knowledge of power supplies

12.01.05	ability to position equipment
12.01.06	ability to connect components
12.01.07	ability to inspect equipment

Sub-task

12.02 Tensions tendons.

Supporting Knowledge & Abilities

<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>
yes	yes	NV	yes	ND	yes	yes	yes	yes	yes	ND	ND	ND

12.02.01	knowledge of stressing sequence and procedures
12.02.02	knowledge of standards and specifications of stressing equipment
12.02.03	knowledge of potential deficiencies of tendons
12.02.04	knowledge of stressing tolerance
12.02.05	knowledge of tendon locking methods
12.02.06	ability to connect stressing equipment to tendons
12.02.07	ability to operate stressing equipment
12.02.08	ability to document elongation and gauge reading

Sub-task

12.03 Cuts and caps tendons.

Supporting Knowledge & Abilities

<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>
yes	yes	NV	yes	ND	yes	yes	yes	yes	yes	ND	ND	ND

12.03.01	knowledge of standards and procedures
12.03.02	knowledge of cutting methods

12.03.03	knowledge of capping methods
12.03.04	ability to read, interpret and apply specifications
12.03.05	ability to operate cutting equipment
12.03.06	ability to secure caps to anchors

Sub-task

12.04 Removes stressing equipment.

Supporting Knowledge & Abilities

<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>
yes	yes	NV	yes	ND	yes	yes	yes	yes	yes	ND	ND	ND

12.04.01	knowledge of dismantling and disconnecting procedures
12.04.02	knowledge of storage procedures
12.04.03	knowledge of methods of disconnecting equipment from tendons
12.04.04	ability to disconnect equipment from tendons
12.04.05	ability to clean and maintain equipment
12.04.06	ability to store equipment

Sub-task

12.05 De-stresses tendons.

Supporting Knowledge & Abilities

<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>
yes	yes	NV	yes	ND	yes	yes	yes	yes	yes	ND	ND	ND

12.05.01	knowledge of engineered procedures and specifications
12.05.02	knowledge of methods of restricting access to work zones

12.05.03	knowledge of possible structure failure during de-stressing procedure
12.05.04	ability to identify and rectify potential hazards such as equipment failure, material failure and danger zones

Task 13 Grouts tendons.

Related Components: Grout, water, admixtures, grout tubes and caps, tie wire, duct tape.

Tools and Equipment: Compressor, hand tools, cleaning equipment (scrapers, wire brushes, hammers), PPE (respirators, rubber gloves, goggles, protective clothing), grouting machine, hoisting and rigging equipment, buckets, safety barriers, screens, hoses, (grout, air, water), generator, power cords, knife, grease gun, communication equipment, tarps.

Sub-task

13.01 Sets up grouting equipment.

Supporting Knowledge & Abilities

<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>
yes	yes	NV	yes	ND	yes	yes	yes	yes	yes	ND	ND	ND

13.01.01	knowledge of types of grouting equipment
13.01.02	knowledge of grouting procedures
13.01.03	knowledge of equipment inspection procedures
13.01.04	knowledge of types of testing equipment
13.01.05	knowledge of material storage procedures
13.01.06	ability to organize material and equipment
13.01.07	ability to clean and maintain equipment
13.01.08	ability to troubleshoot grouting systems
13.01.09	ability to test systems and equipment

Sub-task

13.02 Installs grouts.

Supporting Knowledge & Abilities

<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>
yes	yes	NV	no	ND	yes	yes	yes	yes	yes	ND	ND	ND

- | | |
|----------|---|
| 13.02.01 | knowledge of grouting procedures |
| 13.02.02 | knowledge of measuring quantities and ratios |
| 13.02.03 | knowledge of types of grouting equipment |
| 13.02.04 | knowledge of environmental concerns of grouting |
| 13.02.05 | knowledge of sequence of mixing |
| 13.02.06 | knowledge of cleaning and maintaining procedures |
| 13.02.07 | ability to identify and rectify obstructions in ducts and hoses |
| 13.02.08 | ability to operate grouting equipment |
| 13.02.09 | ability to maintain grouting equipment |
| 13.02.10 | ability to use precision instruments to set machines |

BLOCK F

ERECTION, ASSEMBLY AND INSTALLATION

Trends: The occupation has seen steady advancements in the development of safer work environments. Pre-assembled, modular and composite components are becoming common in the occupation. Hi-tech machine movers with greater precision are also a factor in the changes taking place within the occupation.

Task 14 Installs primary and secondary structural members.

Related Components: Steel members [I and H beams, angles, channels, trusses, tees, columns, girts, joists, Hollow Structural Sections (HSS) tubing, decking (Q)], precast members (panels, beams, columns, single tees, twin tees, AASHTO beams and joists), glue-lam beams, composite members.

Tools and Equipment: Cables, connectors, sledge hammer, turnbuckles, wire rope, surveying instruments, impact gun, pins (drift, bull), welding machine, clip wrench, rigging hardware, spud wrench, sleeve bars, torch, cable clips, plumb bob, come-along, reamer, wedges and jacks, chain fall, clamps, scaffolding, timble.

Sub-task

14.01 Erects falsework.

Supporting Knowledge & Abilities

<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>
yes	yes	NV	yes	ND	yes	yes	yes	yes	yes	ND	ND	ND

14.01.01	knowledge of types and applications of falsework
14.01.02	knowledge of supports and bracing
14.01.03	ability to determine need for falsework
14.01.04	ability to determine location of falsework
14.01.05	ability to lay out and construct falsework
14.01.06	ability to place and secure falsework

Sub-task

14.02 Attaches structural members.

Supporting Knowledge & Abilities

<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>
yes	yes	NV	yes	ND	yes	yes	yes	yes	yes	ND	ND	ND

- 14.02.01 knowledge of types of structural members
- 14.02.02 knowledge of crane signals
- 14.02.03 knowledge of types of bolts and pins
- 14.02.04 knowledge of installation techniques and methods
- 14.02.05 knowledge of tools and equipment capabilities
- 14.02.06 ability to manoeuvre at heights
- 14.02.07 ability to fit, place and modify members
- 14.02.08 ability to determine minimal amount of fasteners to secure load

Sub-task

14.03 Levels, plumbs and aligns structural members.

Supporting Knowledge & Abilities

<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>
yes	yes	NV	yes	ND	yes	yes	yes	yes	yes	ND	ND	ND

- 14.03.01 knowledge of plumbing and alignment equipment such as cables and surveying equipment
- 14.03.02 knowledge of plumbing and aligning techniques and tolerances
- 14.03.03 knowledge of temporary bracing techniques
- 14.03.04 ability to attach tools and equipment such as cables, jacks and temporary bracing

14.03.05	ability to set up and use surveying equipment such as levels, plumb bobs, transits and laser levels
14.03.06	ability to determine direction of pull or push
14.03.07	ability to place shims to the desired elevation

Sub-task

14.04 Completes installation of structural members.

Supporting Knowledge & Abilities

<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>
yes	yes	NV	yes	ND	yes	yes	yes	yes	yes	ND	ND	ND

14.04.01	knowledge of welding, fitting and torque procedures and practices
14.04.02	knowledge of installation of fasteners
14.04.03	knowledge of specifications and tolerances such as for welding and torque
14.04.04	ability to torque bolts
14.04.05	ability to align holes using equipment such as pins, bars and reamers
14.04.06	ability to fabricate connections in place
14.04.07	ability to select fasteners
14.04.08	ability to fit and weld members

Task 15 Installs ornamental components and systems.

Related Components: Steel members [I and H beams, angles, channels, trusses, tees, columns, girts, joists, HSS tubing, decking (Q)], precast members (panels, beams, columns, single and double tee, joists), composite members, windows, pre-cast concrete sections, curtain walls, masonry support lintels, seismic reinforcement supports, stairs (structural and ornamental), hand rails, finishing products such as stainless steel, brass or aluminium coverings (non-ferrous metals), fibre reinforced polymers (FRP), architectural products (ladders, stairs, grating flooring, railings, miscellaneous iron products).

Tools and Equipment: Hand tools, cables, connectors, turnbuckles, wire rope, surveying instruments, impact gun, pins (drift, bull), welding machine, clip wrench, rigging hardware, spud wrench, sleever bars, torch, cable clips, plumb bob, come-along, reamer, wedges and jacks, chain fall, clamps, scaffolding, squares, ratchet set, level, tap and dies, grinder, rivet gun, caulking, sealant, shims.

Sub-task

15.01 Installs curtain walls.

Supporting Knowledge & Abilities

<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>
yes	yes	NV	yes	ND	yes	yes	yes	yes	yes	ND	ND	ND

15.01.01	knowledge of types of curtain walls
15.01.02	knowledge of curtain wall installation procedures
15.01.03	knowledge of sealants
15.01.04	knowledge of layout procedures
15.01.05	knowledge of glazing techniques
15.01.06	ability to establish benchmarks and control lines
15.01.07	ability to work at heights from various types of lifts such as swing stages and aerial work platforms
15.01.08	ability to apply sealants
15.01.09	ability to install as per specifications

Sub-task

15.02 Installs miscellaneous components.

Supporting Knowledge & Abilities

<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>
yes	yes	NV	yes	ND	yes	yes	yes	yes	yes	ND	ND	ND

15.02.01	knowledge of types of miscellaneous components such as stairs, railings and coverings
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15.02.02	knowledge of miscellaneous component installation procedures
15.02.03	ability to determine installation sequence such as sub-assembly and order of installation
15.02.04	ability to fit, weld and finish a variety of materials
15.02.05	ability to set up rigging
15.02.06	ability to field-fabricate and modify components
15.02.07	ability to follow manufacturers' specifications
15.02.08	ability to finish installation such as polishing and painting

Task 16 Installs conveyors, machinery and equipment.

Related Components: Crushers, conveyors, ball mills, guards, rollers, hydraulic gantries, jacking towers, multi-bearing rollers, belts, platework, bearings, pillow block, trunions, hangers, rails, chains, floats, supports, headers, take-ups, chutes, vessels, hoppers, tanks, bins, lubricants.

Tools and Equipment: Multi-roller, hydraulic jacks, track jacks, pry bar, rolling hardware and equipment such as chain-falls, come-alongs, slings, air cushions, shackles, softeners, welding equipment, winches, blocks, rope, surveying equipment, cable tugger, key plates, hammers, forklift, carry deck, strong back, clamps, dogs.

Sub-task

16.01 Installs material handling systems.

Supporting Knowledge & Abilities

<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>
yes	yes	NV	yes	ND	yes	yes	yes	yes	yes	ND	ND	ND

16.01.01	knowledge of types of material handling systems and components
16.01.02	knowledge of material handling installation procedures
16.01.03	ability to assemble components

- 16.01.04 ability to sequence installation of various components such as supports, headers and rails
- 16.01.05 ability to establish work points with surveying equipment

Sub-task

16.02 Aligns material handling systems.

Supporting Knowledge & Abilities

<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>
yes	yes	NV	yes	ND	yes	yes	yes	yes	yes	ND	ND	ND

- 16.02.01 knowledge of specifications and tolerances
- 16.02.02 knowledge of welding and cutting techniques
- 16.02.03 knowledge of methods of alignment
- 16.02.04 ability to determine tolerances from drawings to verify locations
- 16.02.05 ability to use precision tools and measuring instruments such as verniers, micrometers and feeler gauges
- 16.02.06 ability to transfer benchmarks and control lines
- 16.02.07 ability to rig and jack components to specifications
- 16.02.08 ability to troubleshoot for defects and malfunctions
- 16.02.09 ability to secure components

Sub-task

16.03 Places machinery and equipment.

Supporting Knowledge & Abilities

<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>
yes	yes	NV	yes	ND	yes	yes	yes	yes	yes	ND	ND	ND
					16.03.01		knowledge of types of machinery and equipment					
					16.03.02		knowledge of machinery installation procedures					
					16.03.03		knowledge of specifications and tolerances					
					16.03.04		ability to determine weights of machines and components					
					16.03.05		ability to assemble components of machinery					
					16.03.06		ability to insert shims and use adjusting screws for setting and levelling					
					16.03.07		ability to assess best travel path					
					16.03.08		ability to transfer loads to various floats and rollers					
					16.03.09		ability to determine centre of gravity					
					16.03.10		ability to use precision instruments to set machines					

BLOCK G

MAINTENANCE AND UPGRADING

Trends: *The occupation has seen an increased awareness for the need to develop and implement new recycling techniques. The occupation continues to promote safe working conditions by raising the level of awareness of environmental hazards such as asbestos and silicone.*

Task 17 Repairs components.

Related Components: Steel and FRP structural shapes, concrete such as pre-stressed and post-tensioned, plates, non-ferrous metals, conveyor components, sealant, fasteners, welding products.

Tools and Equipment: Architectural scales, calculator, hand tools, power tools, rigging equipment, welding equipment, safety equipment, PPE.

Sub-task

17.01 Assesses current condition of components.

Supporting Knowledge & Abilities

<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>
yes	yes	NV	yes	ND	yes	yes	yes	yes	yes	ND	ND	ND

17.01.01 knowledge of manufacturers' specifications

17.01.02 knowledge of policies and procedures

17.01.03 ability to confirm components meet specifications

17.01.04 ability to communicate observed defects

17.01.05 ability to use diagnostic tools such as calipers and torque wrenches

Sub-task

17.02 Field-fabricates components. Supporting Knowledge & Abilities

<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>
yes	yes	NV	yes	ND	yes	yes	yes	yes	yes	ND	ND	ND

- 17.02.01 knowledge of layout techniques
- 17.02.02 knowledge of manufacturers' specifications
- 17.02.03 knowledge of policies and procedures
- 17.02.04 ability to fit components

Sub-task

17.03 Replaces components. Supporting Knowledge & Abilities

<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>
yes	yes	NV	yes	ND	yes	yes	yes	yes	yes	ND	ND	ND

- 17.03.01 knowledge of policies and regulations
- 17.03.02 knowledge of removal techniques
- 17.03.03 knowledge of installation techniques
- 17.03.04 knowledge of temporary support techniques
- 17.03.05 knowledge of temporary support techniques
- 17.03.06 ability to remove defective components
- 17.03.07 ability to install replacement components
- 17.03.08 ability to verify conditions of repair

Sub-task**17.04 Performs preventative maintenance.****Supporting Knowledge & Abilities**

<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>
yes	yes	NV	yes	ND	yes	yes	no	no	yes	ND	ND	ND

17.04.01	knowledge of manufacturers' specifications
17.04.02	knowledge of policies and procedures
17.04.03	knowledge of materials used such as reinforcing, lubrication and hard surfacing
17.04.04	knowledge of maintenance logs and schedules
17.04.05	knowledge of maintenance techniques
17.04.06	ability to interpret maintenance schedules
17.04.07	ability to perform maintenance techniques such as reinforcing, lubrication and hard surfacing

Task 18 Dismantles and removes structural, mechanical and miscellaneous components.

Related Components: Steel and structural shapes, concrete such as pre-stressed and post-tensioned, plates, non-ferrous metals, conveyor components, sealant, fasteners, welding products.

Tools and Equipment: Architectural scales, calculator, hand tools, power tools, rigging equipment, welding equipment, safety equipment, PPE.

Sub-task

18.01 Ensures decommissioning of structure or components.

Supporting Knowledge & Abilities

<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>
yes	yes	NV	yes	ND	yes	yes	yes	yes	yes	ND	ND	ND

18.01.01	knowledge of policies and procedures such as lock-out, tagging procedures and hot work procedures
18.01.02	knowledge of sequence of decommissioning
18.01.03	knowledge of temporary support techniques
18.01.04	ability to review decommissioning documentation and keep records

Sub-task

18.02 Plans sequence of disassembly.

Supporting Knowledge & Abilities

<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>
yes	yes	NV	yes	ND	yes	yes	yes	yes	yes	ND	ND	ND

18.02.01	knowledge of disassembly sequence
18.02.02	knowledge of disassembly techniques
18.02.03	knowledge of temporary support techniques
18.02.04	ability to determine and prioritize required tasks

Sub-task

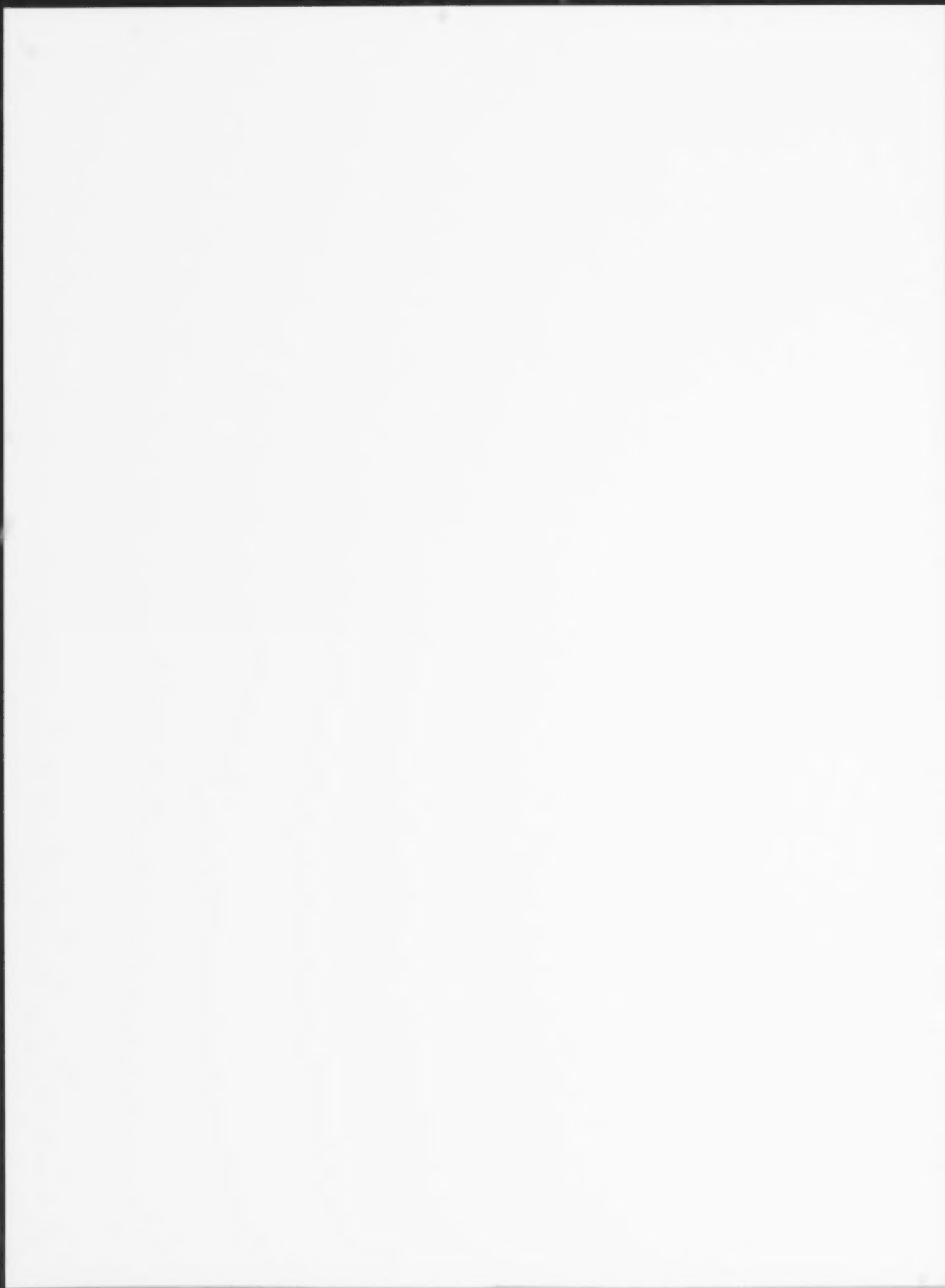
18.03 Removes components.

Supporting Knowledge & Abilities

<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>
yes	yes	NV	yes	ND	yes	yes	yes	yes	yes	ND	ND	ND

18.03.01	knowledge of sequence of tasks
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- 18.03.02 knowledge of storage and placement of components
- 18.03.03 ability to follow sequence of disassembly
- 18.03.04 ability to calculate loads and choker tension



APPENDICES

TOOLS AND EQUIPMENT

Hand Tools

adjustable wrench	needle nose pliers
aligning bar (sleeve bar)	nut drivers
Allen key set	pins (drift, bull)
bar clamps	pipe cutters
beam clamps	pipe wrench
bolt bag	pliers
bolt cutters	prybar
button pump	punch
cable cutters	reamers
centre punch	reel holder
chalk line	rod bag
chipping hammer	scrapers
cold chisel	screwdrivers — Robertson;
combination square	Phillips, flat blades
combination wrench set	side/diagonal cutters
drill bits	sledge hammer
files	slip joint pliers
finger clamps	socket set
flashlight	spud wrench
hack saw	tap set
hammers	tie wire reel
hickey bar	tin snips
knives	tool belt
knocker wrench	tool bucket
marlinspike	wire brush

Power Tools and Equipment

air chisel	impact drill
band saw	impact gun
chop saw	mag drill
circular saw	peening tool
compressor	pencil grinder
disk	porta band
electric hacksaw	powder actuated tool
gas cut-off saw	power drill
gas deck saw	reciprocating saw
generator	rivet buster
grinder	riveting gun
hammer drill	tension control gun
hydraulic jacks (and accessories)	

Measuring and Layout Equipment

bevel squares	rod level
builders level	scale
chalk line	spirit levels
distometers	squares (framing, combination)
laser level	straight edges
laser square	string line
measuring chain	theodolite
measuring tape	torpedo level
micrometers	transit
optical levels	tripods
piano wire	vernier
plumb line	water level
prism	

Safety Equipment

air movers (fans)	life lines
anchor points	perimeter cables
cables	portable lighting
eye wash facilities	ropes (fibre, wire)
fire blankets	signage
fire extinguishers	stanchion posts
first aid equipment	warning tape
fume and toxic gas detector	welding flash screens
guard rails	

Personal Protective Equipment (PPE)

breathable air pack	respirators
chin straps	retractable lanyard
coveralls (fire retardant)	rope grabs
ear plugs	rubber gloves
face shields	safety belt
fall arresters	safety glasses
full body harness	safety vest
gloves	steel toe boots
goggles	welding apron
hard hat	welding gloves
insulated gloves	welding helmet
knee pads	welding jacket
lock-out kit	welding shield

Scaffolding and Access Equipment

aerial work platforms	boom lifts
aluminium framed platform	bosun chair
aluminium planks	electrical articulated boom lift

Scaffolding and Access Equipment (continued)

electrical scissor lifts	ramps
electrical vertical lifts	rolling scaffolds
end frames	sawhorses
extension ladder	scissor-lift
floats (angel's wings)	stationary scaffolds
gas powered articulated boom lift	stepladders
gas powered scissor lifts	swing stages
ladder jack scaffolds	temporary access/freight elevator
ladders	tube and clamps
mechanical scaffolds	

Speciality Tools and Equipment (Welding and Cutting Tools)

arc air (gouger)	radiograph
air lance	stud welding equipment
arc welding machine	stud welding gun
chipping hammer	submerged arc machine
cutting tools (oxygen, acetylene, propane)	thermal cutting machine
MIG welder	thermite welding machine
plasma cutter	tiger torch

Rigging Equipment

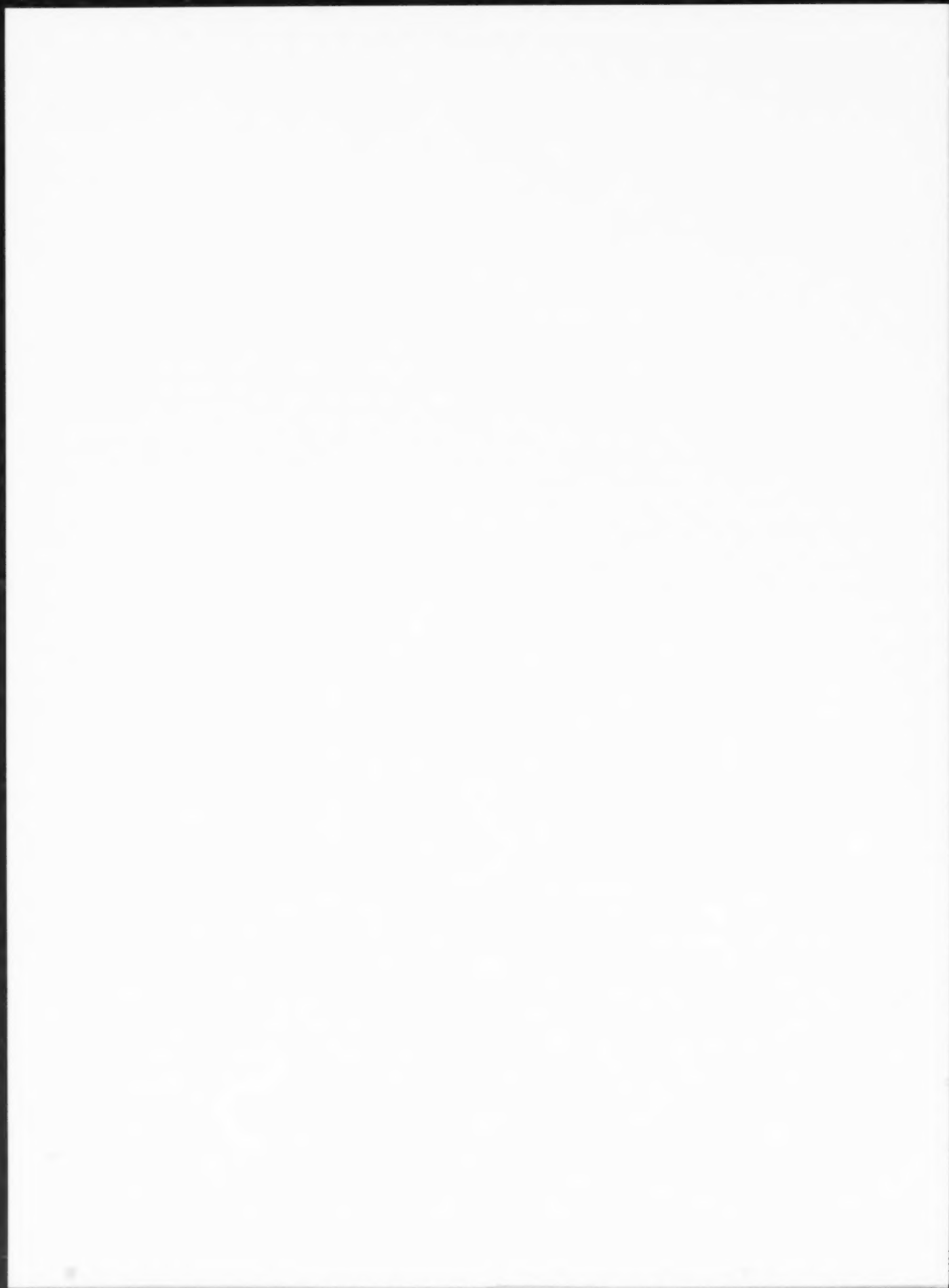
beam clamps	rope clips
binders	shackles
blocks	sheaves
bridle hitch	simple roller
cable clamps	softeners
chain	spreader beam
chain falls	spreaders
come-alongs	swivel
dunnage	synthetic slings
equalizer beam	tackle blocks
eye bolts	thimbles
fibre rope	turnbuckles
hooks	wedge sockets
mechanical/hydraulic jacks	winches
multi-bearing rollers	wire rope
multiple-leg bridle sling	wire rope slings
ring and lines	

Handling Equipment

boom trucks	multi-bearing rollers
chain falls	pallet jack
come-alongs	rollers
cradle	stretcher
forklifts (telescopic, electric, gas powered)	tugger

GLOSSARY

accessories	items used in conjunctions with reinforcing steel such as bar chairs, slab bolsters, etc.
curtain wall	an enclosing wall which provides no structural support
dunnage	wooden boards and timbers used to hold material in place when being transported
falsework	temporary steel or wooden supports upon which final steel is erected
girts	horizontal or vertical framing member to which sash, siding or other finished material is attached
grating	an arrangement of parallel or latticed bars which serve as the floor of a platform, walkway, etc.
miscellaneous iron products	any steel product or component that is not main structural supporting member
ornamental components	non-structural steel, precast or composite members



ACRONYMS

AASHTO	American Association of State Highway and Transportation Officials
ANSI	American National Standards Institute
B & O hammer	Back-out hammer
CRSI	Concrete Reinforcing Steel Institute
CSA	Canadian Standards Association
CWB	Canadian Welding Bureau
EOT crane	Electric overhead travelling crane
HSS	Hollow Structural Sections
OH&S	Occupational Health and Safety
PPE	personal protective equipment
WHMIS	Workplace Hazardous Materials Information System

BLOCK AND TASK WEIGHTING

BLOCK A OCCUPATIONAL SKILLS

	<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>	National Average
%	17	5	NV	5	ND	5	10	5	12	10	ND	ND	ND	9%

Task 1 Interprets occupational documentation.

	<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>	
%	28	25	NV	26	ND	10	10	10	30	30	ND	ND	ND	21%

Task 2 Communicates in the workplace.

	<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>	
%	21	10	NV	21	ND	10	20	30	10	10	ND	ND	ND	17%

Task 3 Uses and maintains tools and equipment.

	<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>	
%	29	40	NV	31	ND	45	35	20	50	30	ND	ND	ND	35%

Task 4 Organizes work.

	<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>	
%	22	25	NV	22	ND	35	35	40	10	30	ND	ND	ND	27%

BLOCK B RIGGING AND HOISTING

	<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>	National Average
%	14	20	NV	21	ND	19	20	15	10	20	ND	ND	ND	17%

Task 5 Selects rigging equipment.

	<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>	
%	50	50	NV	46	ND	30	50	60	50	50	ND	ND	ND	48%

Task 6 Uses hoisting and lifting equipment.

	<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>	
%	50	50	NV	54	ND	70	50	40	50	50	ND	ND	ND	52%

BLOCK C CRANES

	<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>	National Average
%	11	10	NV	10	ND	19	20	10	8	8	ND	ND	ND	12%

Task 7 Assembles and erects cranes.

	<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>	
%	53	50	NV	54	ND	50	50	60	65	50	ND	ND	ND	54%

Task 8 Disassembles cranes.

	<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>	
%	47	50	NV	46	ND	50	50	40	35	50	ND	ND	ND	46%

BLOCK D REINFORCING

	<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>	National Average
%	16	10	NV	9	ND	15	20	25	25	20	ND	ND	ND	17%

Task 9 Fabricates on-site.

	<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>	
%	33	30	NV	52	ND	15	40	70	15	10	ND	ND	ND	33%

Task 10 Installs reinforcing material.

	<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>	
%	67	70	NV	48	ND	85	60	30	85	90	ND	ND	ND	67%

BLOCK E PRE-STRESSES/POST-TENSIONS

	<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>	National Average
%	12	7	NV	8	ND	2	5	5	5	12	ND	ND	ND	7%

Task 11 Places pre-stressed/post-tensioning systems.

	<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>	
%	47	50	NV	24	ND	50	33	40	45	60	ND	ND	ND	44%

Task 12 Stresses tendons.

	<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>	
%	36	40	NV	58	ND	40	34	30	35	30	ND	ND	ND	38%

Task 13 Grouts tendons.

	<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>	
%	17	10	NV	18	ND	10	33	30	20	10	ND	ND	ND	18%

BLOCK F ERECTION, ASSEMBLY AND INSTALLATION

	<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>	National Average
%	17	40	NV	34	ND	30	20	35	35	25	ND	ND	ND	30%

Task 14 Installs primary and secondary structural members.

	<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>	
%	44	50	NV	26	ND	40	60	50	60	70	ND	ND	ND	50%

Task 15 Installs ornamental components and systems.

	<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>	
%	27	30	NV	25	ND	30	20	20	30	15	ND	ND	ND	25%

Task 16 Installs conveyors, machinery and equipment.

	<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>	
%	29	20	NV	49	ND	30	20	30	10	15	ND	ND	ND	25%

BLOCK G MAINTENANCE AND UPGRADING

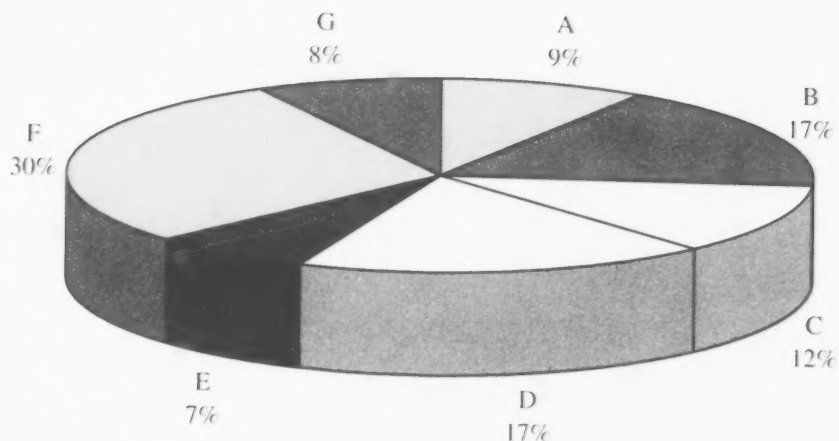
	<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>	National Average
%	13	8	NV	13	ND	10	5	5	5	5	ND	ND	ND	8%

Task 17 Repairs components.

	<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>	
%	31	40	NV	44	ND	70	20	30	50	50	ND	ND	ND	42%

Task 18 Dismantles and removes structural, mechanical and miscellaneous components.

	<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>	
%	69	60	NV	56	ND	30	80	70	50	50	ND	ND	ND	58%

PIE CHART***TITLES OF BLOCKS**

Block A	Occupational Skills	Block E	Pre-Stresses/Post-Tensions
Block B	Rigging and Hoisting	Block F	Erection, Assembly and Installation
Block C	Cranes	Block G	Maintenance and Upgrading
Block D	Reinforcing		

* Average percentage of the total number of questions on an interprovincial examination, assigned to assess each block of the analysis, as derived from the collective input from workers within the occupation from all areas of Canada. Interprovincial examinations typically have from 100 to 150 multiple-choice questions.



TASK PROFILE CHART - IRONWORKER (GENERALIST) (2006)

BLOCKS	TASKS	← SUB-TASKS →					
A OCCUPATIONAL SKILLS	1. Interprets occupational documentation.	1.01 Interprets drawings and specifications.	1.02 Interprets standards, regulations and procedures.				
	2. Communicates in the workplace.	2.01 Communicates with co-workers.	2.02 Communicates with other disciplines.	2.03 Communicates with apprentices.	2.04 Uses hand signals.	2.05 Communicates electronically.	
	3. Uses and maintains tools and equipment.	3.01 Uses hand tools.	3.02 Uses power tools.	3.03 Uses bending tools and equipment.	3.04 Uses powder-actuated tools.	3.05 Uses aerial work platforms.	3.06 Uses ladders.
		3.07 Uses scaffolding.					
	4. Organizes work.	4.01 Organizes materials and supplies.	4.02 Marks layouts.	4.03 Maintains safe work environment.	4.04 Assesses site hazards.	4.05 Plans work tasks.	
B RIGGING AND HOISTING	5. Selects rigging equipment.	5.01 Matches load to lift capability.	5.02 Inspects rigging equipment.	5.03 Maintains rigging equipment.			
	6. Uses hoisting and lifting equipment.	6.01 Uses hoisting equipment.	6.02 Uses lifting equipment.	6.03 Attaches rigging to load.			
C CRANES	7. Assembles and erects cranes.	7.01 Assesses site hazards.	7.02 Determines crane position.	7.03 Prepares bases.	7.04 Erects cranes.		

IRONWORKER (GENERALIST) (2006)

BLOCKS	TASKS	SUB-TASKS				
D REINFORCING	8. Disassembles cranes.	8.01 Disassembles crane components.	8.02 Prepares crane for transport.			
	9. Fabricates on-site.	9.01 Cuts material.	9.02 Bends material.			
	10. Installs reinforcing material.	10.01 Places reinforcing material.	10.02 Ties material.	10.03 Joins material.		
E PRE-STRESSES/POST-TENSIONS	11. Places pre-stressed/post-tensioning systems.	11.01 Lays out profile.	11.02 Places tendons and accessories.	11.03 Installs bursting steel and anchorages.	11.04 Connects tendons to anchors.	11.05 Protects exposed tendons.
	12. Stresses tendons.	12.01 Sets up stressing equipment.	12.02 Tensions tendons.	12.03 Cuts and caps tendons.	12.04 Removes stressing equipment.	12.05 De-stresses tendons.
	13. Grouts tendons.	13.01 Sets up grouting equipment.	13.02 Installs grouts.			
F ERECTION, ASSEMBLY AND INSTALLATION	14. Installs primary and secondary structural members.	14.01 Erects falsework.	14.02 Attaches structural members.	14.03 Levels, plumbs and aligns structural members.	14.04 Completes installation of structural members.	
	15. Installs ornamental components and systems.	15.01 Installs curtain walls.	15.02 Installs miscellaneous components.			

IRONWORKER (GENERALIST) (2006)

BLOCKS

TASKS

SUB-TASKS

G

MAINTENANCE AND UPGRADING

16. Installs conveyors, machinery and equipment.

16.01 Installs material handling systems.

16.02 Aligns material handling systems.

16.03 Places machinery and equipment.

17. Repairs components.

17.01 Assesses current condition of components.

17.02 Field-fabricates components.

17.03 Replaces components.

17.04 Performs preventative maintenance.

18. Dismantles and removes structural, mechanical and miscellaneous components.

18.01 Ensures decommissioning of structure or components.

18.02 Plans sequence of disassembly.

18.03 Removes components.

